



60Hz

R410A



CHILLERS AND HEAT PUMPS - Technical - Installation manual

ANL 100-150HA

60Hz



EN



IANL60HzPY. 1007. 6755517_00

Dear Customer,

Thank you for choosing an AERMEC product. This product is the result of many years of experience and in-depth engineering research, and it is built using top quality materials and advanced technologies.

In addition, the CE mark guarantees that our appliances fully comply with the requirements of the European Machinery Directive in terms of safety.

We constantly monitor the quality level of our products, and as a result they are synonymous with Safety, Quality, and Reliability.

Product data may be subject to modifications deemed necessary for improving the product without the obligation to give prior notice.

Thank you again.

AERMEC S.p.A

SUMMARY

1.	General warnings	6
2.	Product identification.....	6
3.	Description and choice of unit	7
4.	Configurator	8
5.	Description of the components.....	9
5.1.	Cooling circuit.....	9
5.2.	Frame and fans.....	9
5.3.	Hydraulic circuit	9
5.4.	Control and safety components	10
5.5.	Electric components	10
5.6.	Electronic modu control adjustment.....	10
6.	Accessories compatibility table	10
7.	Technical data.....	11
8.	Operating limits.....	12
8.1.	Cooling mode.....	12
8.2.	Heating mode (for heating pump)	12
8.3.	Project data	12
9.	Performance in cooling mode.....	13
9.1.	ANL 100	13
9.2.	ANL 150	13
10.	Performance in heating mode	14
10.1.	ANL 100 H.....	14
10.2.	ANL 150 H.....	14
11.	Ethylene glycol solutions.....	15
11.1.	How to interpret glycol curves	15
11.2.	Static pressures useful to the system.....	16
12.	Storage tank	17
12.1.	Minimum/maximum content of system water	17
12.2.	Expansion vessel calibration	17
13.	Sound data	18
14.	Parameter calibration of safety and control	18
15.	Receiving the product and installation.....	20
15.1.	Receiving the product and handling	20
16.	Internal hydraulic circuit	21
17.	External hydraulic circuit anl (not provided)	21

ANLH

SERIAL NUMBER	
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CE DECLARATION OF CONFORMITY We, the undersigned, hereby declare under our own responsibility that the assembly in question, defined as follows:

NAME ANL
TYPE WATER/AIR chiller, heat pump
MODEL

To which this declaration refers, complies with the following harmonised standards

CEI EN 60335-2-40	Safety standard regarding electrical heat pumps, air conditioners and dehumidifiers
CEI EN 61000-6-1 CEI EN 61000-6-3	Immunity and electromagnetic emissions for residential environments
CEI EN 61000-6-2 CEI EN 61000-6-4	Immunity and electromagnetic emissions for industrial environments
EN378	Refrigerating system and heat pumps - Safety and environmental requirements
EN12735	Copper and copper alloys - Seamless, round copper tubes for air conditioning and refrigeration
UNI 12735	Seamless, round copper tubes for air conditioning and refrigeration
UNI 14276	Pressure equipment for cooling systems and heat pumps

Therefore complying with the essential requisites of the following Directives:

- Directive LVD: 2006/95/CE
- Electromagnetic compatibility Directive 2004/108/CE
- Machinery Directive 2006/42/CE
- PED Directive regarding pressurised devices 97/23/CE

The product, in agreement with Directive 97/23/CE, satisfies the Total quality Guarantee procedure (form H) with certificate n.06/270-QT3664 Rev.5 issued by the notified body n.1131 CEC via Pisacane 46 Legnano (MI) - Italy

The person authorized to compile the technical file is: Massimiliano Sfragara - 37040 Bevilacqua (VR) Italy-Via Roma, 996

Bevilacqua

07/07/2010

Marketing Director
Signature



1. GENERAL WARNINGS

AERMEC ANLs are constructed according to the recognised technical standards and safety regulations. They have been designed for air conditioning and the production of domestic hot water (DHW) and must be destined to this use compatibly with their performance features. Any contractual or extra-contractual liability of the Company is excluded for injury/damage to persons, animals or objects owing to installation, regulation and maintenance errors or improper use. All uses not expressly indicated in this manual are prohibited.

PRESERVATION OF THE DOCUMENTATION

The instructions along with all the related documentation must be given to the user of the system, who assumes the responsibility to conserve the instructions so that they are always at hand in case of need. Read this sheet carefully; all works must be performed by qualified staff, according to Standards in force on this subject in different countries. (Ministerial Decree 329/2004).

The appliance must be installed in such a way as to enable maintenance and/or repairs to be carried out.

The appliance warranty does not

cover the costs for ladders, scaffolding, or other elevation systems that may become necessary for carrying out servicing under warranty.

Do not modify or tamper with the chiller as dangerous situations can be created and the manufacturer will not be liable for any damage caused. The validity of the warranty shall be void in the event of failure to comply with the above-mentioned indications.



Standards and Directives respected on designing and constructing the unit

Safety:

Machinery Directive
2006/42/CE

Low Voltage Directive
LVD 2006/95/CE

Electromagnetic compatibility
Directive
EMC 89/336/CEE

Pressure Equipment Directive
PED 97/23/CE EN 378,
UNI EN 14276

Electric part:

EN 60204-1

Protection rating
IP24

Acoustic part:

ISO DIS 9614/2
(intensimetric method)

Performance data:

norma UNI EN 14511

Refrigerant GAS:

This unit contains fluoride gases with greenhouse effect covered by the Kyoto Protocol. Maintenance and disposal must only be performed by qualified staff.

R410A GWP=1900

2. PRODUCT IDENTIFICATION

ANL are identified by the following:

–PACKAGING LABEL

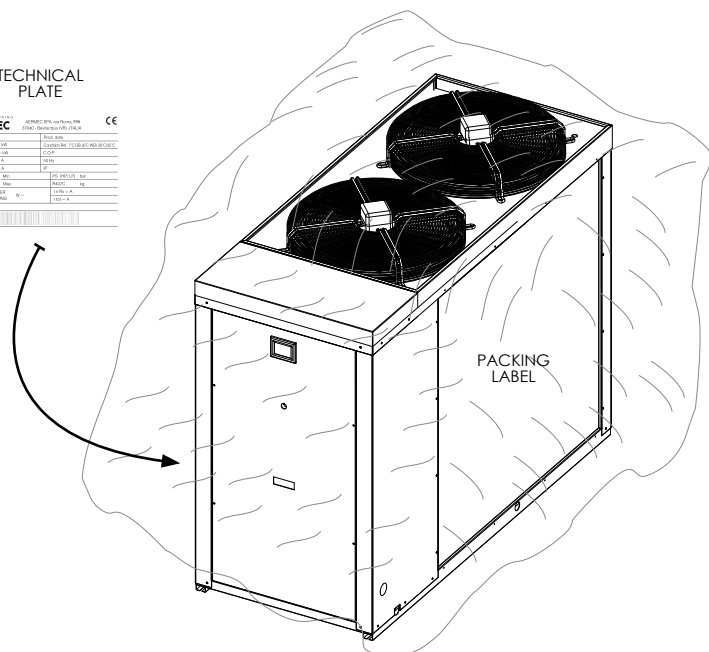
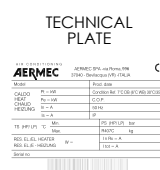
that includes the product identification data

–TECHNICAL PLATE

Placed on the right strut side (see fig.1)

NOTE:

If the identification plate, or any other means to identify the product, is tampered with, removed or missing, installation and maintenance operations are hampered



3. DESCRIPTION AND CHOICE OF UNIT

ANL R410A coolers and air cooled heat pumps have been designed and manufactured to satisfy heating and cooling needs and the production of domestic hot water (DHW) in medium to small commercial or residential buildings.

These units, available in 2 sizes, have extremely silent functioning and are highly efficient and reliable, thanks to the use of exchangers with a large exchange surface and low-noise high-efficiency scroll compressors.

They are available in the following versions:

- HEAT PUMP **ANL H**
Winter to summer switch-over functioning can be applied via the cooling circuits.
Possibility of producing DHW (DCPX mandatory)
- STORAGE AND PUMP

NOTES

Refer to the configurator for the set-ups that are not possible.

WARNING

Before use (or after a prolonged period of suspension) of units with low air temperature functioning and also with a heat pump, it is of extreme importan-

ce that the oil in the sump compressor is heated for at least 8 hours using the electrical resistances. The sump resistance is powered automatically when the unit stops as long as the unit is live.

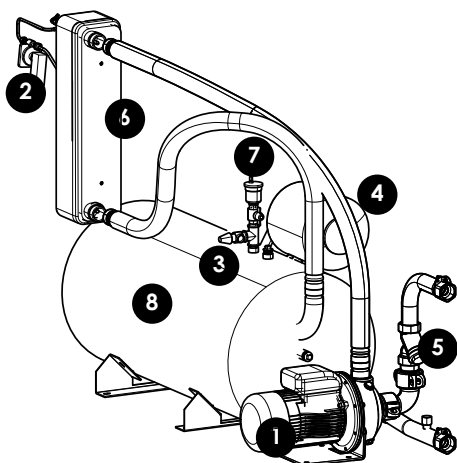
4. CONFIGURATOR

1,2,3	4,5,6	7	8	9	10	11	12	13
ANL	100	H	A	°	°	°	°	6

FIELD	CODE	
1, 2, 3	ANL	
4, 5, 6	SIZE	100 -150
7	MODEL	
	H	Heat Pump
8	VERSION	
	A	with storage tank and pump
9	HEAT RECOVERY	
	°	without heat recovery units
10	COILS	
	°	in aluminium
11	FIELD OF USE	
	°	temperature of water produced up to 4 °C / 39°F
12	EVAPORATOR	
	°	standard, by PED
13	SUPPLY	
	6	3~220-60Hz
	7	3~460-60Hz

Example of configurator: ANL100HA°°°°6

Examples of hydraulic circuits
the diagram shown here are an example



▲
VERSIONE A 100 - 150

KEY

- 1 Circulator/pump
- 2 Differential pressure switch
- 3 Safety valve
- 4 Expansion vessel
- 5 Water filter
- 6 Plate heat exchanger
- 7 Vent valve
- 8 Storage tank

5. DESCRIPTION OF THE COMPONENTS

5.1. COOLING CIRCUIT

Compressor

High efficient scroll type on anti-vibration mounts, activated by a 2-pole electric motor with internal circuit breaker protection. They are supplied, as standard, with an electric anti-freeze resistance, powered automatically when the unit stops as long as the unit is live.

Air-side heat exchanger

Made with copper pipes and aluminium louvered fins blocked by mechanical expansion of the pipes. Provided with protective grid.

Water-side heat exchanger

Water-side heat exchanger
Plate type, isolated externally with closed cell material to reduce heat loss.

Dehydrator filter

Mechanical type filter realised in ceramics and hygroscopic material, able to withhold impurities and any traces of humidity present in the cooling circuit.

Thermostatic valve

Mechanical valve, with external equaliser positioned at evaporator outlet, modulates the flow of gas to the evaporator, depending on the heat load, in order to ensure a correct heating level of the intake gas.

Solenoid valve of hot gas injection

The valve positioned between the compressor and the thermostatic valve outlet controls:

- Defrosting cycles without having to reverse the cycle
- Safety capacity control if the pressure should rise on the pressing line

Cycle reversing valve

(for heat pump only.)
Reverses the flow of refrigerant on variation of summer/winter mode and during any defrosting cycles.

One-way valve

Allows one-way flow of the refrigerant.

Liquid storage

(for heat pump only.)
Compensates the difference in volume between louvered fin coil and plate

exchanger, withholding excess liquid during winter functioning.

5.2. FRAME AND FANS

Ventilation unit

Helical type, balanced statically and dynamically. Electric fans are protected electrically by magnet-circuit breakers and mechanically by anti-intrusion metal grids, according to IEC EN 60335-2-40 Standard.

Support frame

Made in hot galvanised sheet steel with suitable thickness and painted with polyester powders able to resist atmospheric agents through time.

5.3. HYDRAULIC CIRCUIT

Circulation pump (circulator)

Differential pressure switch

Positioned between inlet and outlet of evaporator. It has the task of controlling that there is water circulation, if this is not the case it blocks the unit.

Water filter

This allows to block and eliminate any impurities present in the hydraulic circuits. It contains a filtering mesh with holes that do not exceed one millimetre. It is indispensable in order to prevent serious damage to the plate exchanger.

Storage tank

It is required to reduce the number of peaks of the compressor and to even the temperature of water to be sent to the utilities.

- for ANL 100 - 150 da [100 l]

Vent valve

(only for versions with hydronic unit or with a pump)
Manual type, discharges any air pockets present. It is interrupted by a cock to facilitate any replacement.

Expansion vessel

membrane type with nitrogen pre-load.

Hydraulic circuit safety valve

Calibrated at 6 BAR (87 psi) and with conveyable discharge, intervenes by discharging the overpressure in the case of pressure anomalies.

5.4. CONTROL AND SAFETY COMPONENTS

High pressure pressure switch (HP)

With fixed calibration, placed on high pressure side of cooling circuit, inhibits functioning of compressor if abnormal work pressure occurs.

Low pressure transducer (TBP) Heat pump (H)

Placed on low pressure side of cooling circuit, it communicates the work pressure to the control board, generating a pre-alarm if abnormal pressure occurs.

High pressure transducer (TAP)

Placed on high pressure side of cooling circuit, it communicates the work pressure to the control board, generating a pre-alarm if abnormal pressure occurs.

5.5. ELECTRIC COMPONENTS

Electric Control Board

Contains the power section and the management of controls and safety devices. It is in compliance with the IEC 60204-1 Standard and the Directives regarding electromagnetic compatibility EMC 89/336/EEC and 92/31/EEC.

Door-lock isolating switch

The electric control board can be accessed by removing the voltage. Act on the opening lever of the control board itself. This lever can be locked using one or more padlocks during maintenance interventions to prevent the machine being powered up accidentally.

Control board

Allows complete control of the appliance.

For a more in-depth description please refer to the user manual.

- compressors magnet circuit-breaker protection.
- fans magnet-circuit breakers protection;
- auxiliary magnet circuit-breaker protection
- Heat exchanger inlet/outlet water temperature probes
- Gas temperature probe one on the

for pressing line and coil

- External air temperature probe WITH DCPX ACCESSORY

5.6. ELECTRONIC MODU CONTROL ADJUSTMENT

MODU CONTROL

Temperature control of the outlet water with proportional-integral algorithm: maintains average outlet temperature at value set

- Self-adapting differential switch: guarantees minimum functioning times of the compressor in systems with low water content.
- Intelligent defrosting for pressure reduction: allows to determine when the coil is effectively defrosted, avoiding useless defrosting
- Hot gas injection defrosting: In this way the machine consumes less energy, increases heating capacity, keeps efficiency high and prevents temperature drops at the terminals (very important in plants with low water content Emergency defrosting by cooling cycle reversing: to overcome more serious conditions
- Set-point compensation with external temperature (with external air probe accessory): reduces energy consumption
- Condensation check based on the pressure rather than on temperature for absolute stability (with DCPX revs. adjuster accessory)
- Inverse condensation check for the heat pump functioning mode also in summer (with DCPX revs. adjuster accessory).
- Pre-alarms with automatic reset: in the case of alarm, a certain number of re-starts are allowed before the definitive block.
- Alarm on the ΔT : to identify wiring errors (reverse rotation) or blocked cycle reversing valve.
- Compressor functioning hours count
- Compressor peak count.
- Historical alarms
- Autostart after voltage drop.
- Local or remote control

Display of unit status:

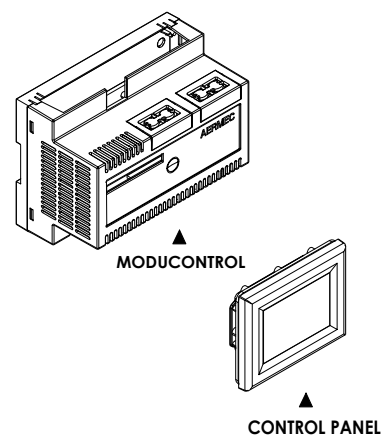
- a. Voltage presence

- b. Compressor ON/OFF
- c. Functioning mode (hot/cold)
- d. Alarm active
- Probes, transducers and parameters display
 - a. Water outlet
 - b. Water inlet
 - c. Coil temperature (heat pumps)
 - d. Pressing line gas temperature
 - e. External air temperature (heat pumps, cooling only with DCPX and probe)
 - f. Flow pressure (heat pumps)
 - g. Intake pressure (heat pumps)
 - h. Temperature error (sum of the proportional and integral error)
 - i. Stand-by times for start-up/switch-off of the compressor
- Alarms management
 - a. Low pressure
 - b. High pressure (primary alarm: the pressure switch directly blocks power supply to compressor)
 - c. High discharge temperature
 - d. Anti-freeze
 - e. Water differential flow meter/pressure switch
 - f. Alarm on the ΔT
- Alarms with automatic reset with limited number of re-starts before blockin
- ON/OFF from external contact
- Change season from external contact

ATTENTION:

► DCPX not supplied

► For further information please refer to user manual



6. ACCESSORIES COMPATILTY TABLE

ACCESSORIES ANL		MODELS	100	150
ANTI-VIBRATION MOUNTS		VERSION	100	150
VT	Group of four anti-vibration mounts to be installed under the sheet steel base in the prepared points. They are used to reduce vibrations produced by the compressor whilst functioning.	A	15	15

7. TECHNICAL DATA		Power supply	M.U.	100HA	150HA
COOLING					
Cooling capacity	220-3-60 Hz	kW / Tons	23.11 / 6.57	28.69 / 8.15	
	460-3-60 Hz	kW / Tons	23.11 / 6.57	28.69 / 8.15	
Total input power [*]	220-3-60 Hz	kW	8.24	9.48	
	460-3-60 Hz	kW	8.24	9.48	
Water flow rate	220-3-60 Hz	l/h/ gpm	3974 / 17.50	4934 / 21.72	
	460-3-60 Hz	l/h/ gpm	3974 / 17.50	4934 / 21.72	
HEATING					
Heating capacity	220-3-60 Hz	kW / BTU	27.77 / 94,840	32.78 / 111,949	
	460-3-60 Hz	kW / BTU	27.77 / 94,840	32.78 / 111,949	
Total input power [*]	220-3-60 Hz	kW	8.29 / 28,312	9.57 / 32,683	
	460-3-60 Hz	kW	8.29 / 28,312	9.57 / 32,683	
Water flow rate	220-3-60 Hz	l/h/ gpm	4776 / 21.03	5639 / 24.83	
	460-3-60 Hz	l/h/ gpm	4776 / 21.03	5639 / 24.83	
ENERGY INDEXES					
EER [*]	220-3-60 Hz		11.43	11.7	
	460-3-60 Hz		11.43	11.7	
COP [*]	220-3-60 Hz		3.35	3.43	
	460-3-60 Hz		3.35	3.43	
IPLV	220-3-60 Hz		4.80	5.19	
	460-3-60 Hz		4.80	5.19	
ELECTRICAL DATA					
Input current on COOLING	220-3-60 Hz	A	29.6	32.4	
	460-3-60 Hz		14.2	15.5	
Input current on HEATING	220-3-60 Hz	A	29.8	32.7	
	460-3-60 Hz		14.3	15.6	
Maximum current(FLA)	220-3-60 Hz	A	70.4	84.6	
	460-3-60 Hz		36.8	45.8	
Peak current (LRA)	220-3-60 Hz	A	162.4	187.6	
	460-3-60 Hz		93.1	108.9	
MCA	220-3-60 Hz	A	67	80.6	
	460-3-60 Hz		36.4	44.9	
MOP	220-3-60 Hz	A	106.1	127.3	
	460-3-60 Hz		53.1	66.8	
COMPRESSORS (SCROLL)					
Number/Circuit		n°	2/1	2/1	
Resistance sump compressor		n°xW	2x35	2x35	
Capacity controls		%	0-50-100	0-50-100	
FANS (AXIAL)					
Quantity		n°	2	2	
Air flow rate		mc/h	13.200	12.000	
Input power		kW	0.6	0.6	
Input current		A	2.6	2.6	
EVAPORATORS (PLATES)					
Quantity		n°	1	1	
CHARGE					
Gas refrigerant (R410A)		Kg / lbs.	12.7 / 27.99	16.0 / 35.27	
Oil compressor			2x1.6 / 2x3.53	2x1.6 / 2x3.53	
CIRCULATION PUMP					
Input power		kW	0.75	1.5	
Input current	220-3-60 Hz	A	3.6	6.2	
	460-3-60 Hz		1.7	3.0	
Useful head (1)		kPa / ft/h	92 / 31	120 / 40	
STORAGE TANK					
Water storage tank		l / gal	100/26.41	100/26.41	
HYDRAULIC CONNECTIONS					
Inlet for water circulation		Ø	1"¼	1"¼	
Outlet for water circulation		Ø	1"¼	1"¼	
SOUND DATA					
Sound power		dB(A)	76.0	77.0	
Sound pressure (2)		dB(A)	44.0	45.0	
DIMENSIONS UNIT (PALLET)					
Height	pallet	mm / in.	1486 / 59	1486 / 59	
Width		mm / in.	870 / 34	870 / 34	
Depth		mm / in.	1850 / 73	1850 / 73	
DIMENSIONS ONLY UNIT					
Height		mm / in.	1345 / 53	1345 / 53	
Width		mm / in.	750 / 30	750 / 30	
Depth		mm / in.	1750 / 69	1750 / 69	
Weight when empty		kg / lbs.	363 / 800	393 / 800	

Nominal conditions reference

COOLING MODE

- Inlet water temperature.....12°C / 54°F
- Outlet water temperature..... 7°C / 45°F
- Outside air temperature 35°C / 95°F
- Δt.....5°C / 41°F

HEATING MODE

- Inlet water temperature.....40°C / 104°F
- Outlet water temperature.....45°C / 113°F
- Outside air temperature.....7/6°C 45/43°F
- Δt.....5°C / 41°F

[*] Performance values refer to without pump version

(1) Useful head calculated in cooling mode 12°C/7°C, 35°C (°54F/°45F, 95°F)

(2) Sound Pressure measured in free field conditions with reflective surface (directivity factor Q=2) at 10 mt distance from external surface of unit, in compliance with ISO 3744 regulations.

8. OPERATING LIMITS

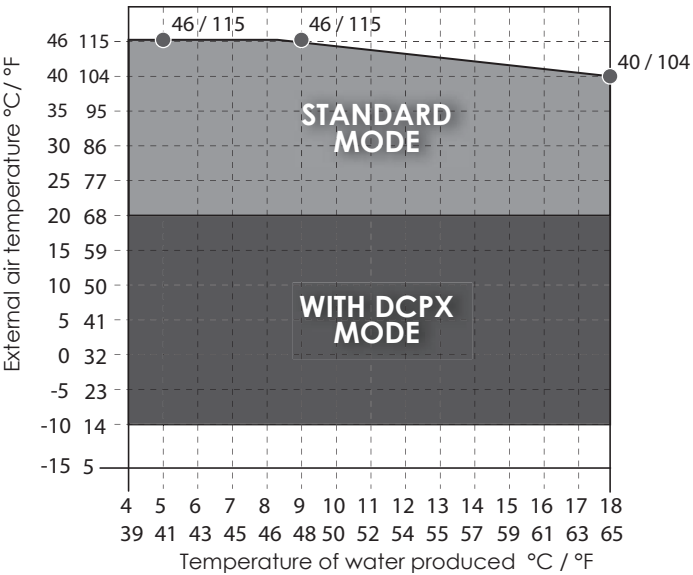
The units, in standard configuration, are not suitable for installation in salty environments. The maximum and minimum limits for water flow rate to the heat exchanger are indicated by the pressure drop diagram curves.

For functioning limits, please refer to the diagrams below, valid for $\Delta t = 5\text{ }^{\circ}\text{C}$ ($40\text{ }^{\circ}\text{F}$).

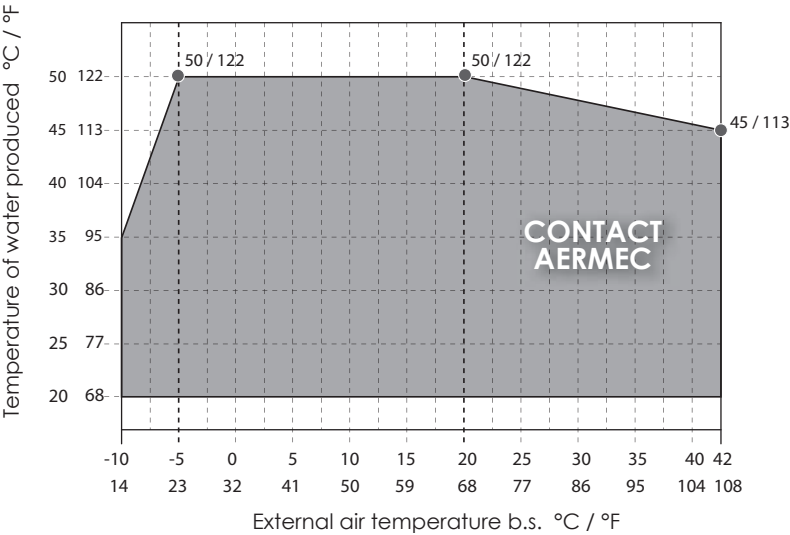
ATTENTION
If the machine is to be operated out of the limits indicated in the diagram, please contact

AERMEC technical-sales dept. If it is installed in a particularly windy zone, a windbreak should be provided to avoid unstable operation of the DCPX device.

8.1. COOLING MODE



8.2. HEATING MODE (FOR HEATING PUMP)



8.3. PROJECT DATA

		High pressure side	Low pressure side
Acceptable maximum pressure	bar/psi	42/609	25/362
Acceptable maximum temperature	°C / °F	120 / 248	52 / 126
Acceptable minimum temperature	°C / °F	-10 / 14	-16 / 3

9. PERFORMANCE IN COOLING MODE

9.1. ANL 100

	Temp. of water produced (°C) / (°F)	External air temperature											
		20/68		25/77		30/86		35/95		40/104		45/113	
		Pc	Pe	Pc	Pe	Pc	Pe	Pc	Pe	Pc	Pe	Pc	Pe
With thermostatic valve Standard	4 /39	30.3	5.80	28.6	6.62	26.8	7.49	25.1	8.26	23.3	8.95	21.6	9.45
	6 /43	31.5	5.80	29.8	6.67	28.0	7.53	26.1	8.31	24.3	9.04	22.5	9.54
	7 /45	32.2	5.89	30.3	6.71	28.5	7.58	26.6	8.40	24.8	9.04	23.0	9.54
	8 /46	32.8	5.93	30.9	6.76	29.1	7.62	27.2	8.40	25.3	9.08	23.5	9.59
	10/50	34.0	5.98	32.1	6.85	30.1	7.67	28.2	8.49	26.3	9.13	-	-
	12/54	35.1	6.03	33.2	6.89	31.2	7.76	29.2	8.54	27.3	9.18	-	-
	14/57	36.3	6.12	34.3	6.94	32.2	7.81	30.2	8.58	28.2	9.22	-	-
	16/61	37.4	6.16	35.4	6.98	33.3	7.85	31.2	8.63	29.1	9.27	-	-
	18/65	38.5	6.21	36.4	7.08	34.3	7.94	32.2	8.67	30.1	9.36	-	-

9.2. ANL 150

	Temp. of water produced (°C) / (°F)	External air temperature											
		20/68		25/77		30/86		35/95		40/104		45/113	
		Pc	Pe	Pc	Pe	Pc	Pe	Pc	Pe	Pc	Pe	Pc	Pe
With thermostatic valve Standard	4 /39	37.6	6.90	35.5	7.88	33.3	8.91	31.1	9.84	28.9	10.65	26.8	11.25
	6 /43	39.1	6.90	36.9	7.93	34.7	8.97	32.4	9.89	30.2	10.76	28.0	11.36
	7 /45	39.9	7.01	37.6	7.99	35.4	9.02	33.0	10.00	30.8	10.76	28.5	11.36
	8 /46	40.6	7.07	38.4	8.04	36.1	9.08	33.7	10.00	31.4	10.82	29.1	11.41
	10/50	42.1	7.12	39.8	8.15	37.4	9.13	35.0	10.11	32.6	10.87	-	-
	12/54	43.6	7.17	41.2	8.21	38.7	9.24	36.2	10.16	33.8	10.92	-	-
	14/57	45.0	7.28	42.5	8.26	40.0	9.29	37.5	10.22	35.0	10.98	-	-
	16/61	46.4	7.34	43.9	8.32	41.3	9.35	38.7	10.27	36.1	11.03	-	-
	18/65	47.8	7.39	45.2	8.42	42.6	9.46	39.9	10.33	37.3	11.14	-	-

IN COOLING MODE

- Inlet water temperature	12 °C / 54 °F
- Outlet water temperature	7 °C / 45 °F
- External air temperature	35 °C / 95 °F
- Δt	5°C / 41 °F

Pc Cooling capacity (kW)/(BTU)
Pe Input power (kW)/(BTU)

10. PERFORMANCE IN HEATING MODE

10.1. ANL 100 H

External air temperature (C°)/(°F) B.S.	Temperature of produced water °C / °F							
	35/95		40/104		45/113		50/122	
	Ph	Pe	Ph	Pe	Ph	Pe	Ph	Pe
-10 / 14	47.32	7.34	-	-	-	-	-	-
-8 / 18	44.95	7.34	46.10	7.92	-	-	-	-
-6 / 21	42.81	7.29	43.85	7.92	18.71	8.55	-	-
-4 / 25	40.86	7.34	41.81	7.92	19.65	8.55	19.18	9.59
-2 / 28	39.09	7.34	39.96	7.92	20.58	8.55	19.65	9.59
0 / 32	37.46	7.34	38.26	7.97	21.52	8.55	20.58	9.59
2 / 36	35.96	7.34	36.69	7.97	22.45	8.55	21.98	9.59
4 / 39	29.97	7.34	30.47	7.97	26.66	8.60	26.19	9.64
6 / 43	28.54	7.34	29.00	7.97	28.53	8.60	27.60	9.64
7 / 45	27.66	7.38	28.54	7.97	4.68	4.50	28.06	9.64
8 / 46	27.24	7.38	27.66	7.97	29.0	8.60	29.00	9.64
10 / 50	26.06	7.38	26.84	8.01	30.87	8.60	29.94	9.64
12 / 54	24.97	7.38	25.69	8.01	31.81	8.65	30.87	9.64
14 / 57	23.97	7.38	24.97	8.01	32.74	8.65	31.81	9.68
16 / 61	23.35	7.38	23.97	8.01	34.15	8.65	32.74	9.68
18 / 65	22.48	7.38	23.05	8.01	35.08	8.65	33.68	9.68
20 / 68	21.66	7.38	22.20	8.01	36.48	8.65	35.08	9.68

10.2. ANL 150 H

External air temperature (C°)/(°F) B.S.	Temperature of produced water °C / °F							
	35/95		40/104		45/113		50/122	
	Ph	Pe	Ph	Pe	Ph	Pe	Ph	Pe
-10 / 14	57.11	8.62	-	-	-	-	-	-
-8 / 18	54.25	8.62	55.64	9.31	-	-	-	-
-6 / 21	51.67	8.57	52.93	9.31	22.58	10.05	-	-
-4 / 25	49.32	8.62	50.47	9.31	23.71	10.05	23.15	11.26
-2 / 28	47.17	8.62	48.22	9.31	24.84	10.05	23.71	11.26
0 / 32	45.21	8.62	46.17	9.36	25.97	10.05	24.84	11.26
2 / 36	43.40	8.62	44.29	9.36	27.10	10.05	26.53	11.26
4 / 39	36.17	8.62	36.78	9.36	32.18	10.10	31.61	11.32
6 / 43	34.44	8.62	35.00	9.36	34.44	10.10	33.31	11.32
7 / 45	33.38	8.67	34.44	9.36	5.65	5.29	33.87	11.32
8 / 46	32.88	8.67	33.38	9.36	35.0	10.10	35.00	11.32
10 / 50	31.45	8.67	32.39	9.41	37.26	10.10	36.13	11.32
12 / 54	30.14	8.67	31.00	9.41	38.39	10.15	37.26	11.32
14 / 57	28.93	8.67	30.14	9.41	39.52	10.15	38.39	11.37
16 / 61	28.18	8.67	28.93	9.41	41.21	10.15	39.52	11.37
18 / 65	27.13	8.67	27.82	9.41	42.34	10.15	40.65	11.37
20 / 68	26.14	8.67	26.79	9.41	44.03	10.15	42.34	11.37

COOLING MODE

- Inlet water temperature 12 °C / 54 °F
 - Outlet water temperature 7 °C / 45 °F
 - External air temperature 35 °C / 95 °F
 - Δt 5 °C / 41 °F

HEATING MODE

- Inlet water temperature 40 °C / 104 °F
 - Outlet water temperature 45 °C / 113 °F
 - External air temperature b.s. 7 °C / b.s. 45 °F
 - Δt 5 °C / 41 °F

Ph Cooling capacity (kW)(BTU)
 Pe Input power (kW)(BTU)

11. ETHYLENE GLYCOL SOLUTIONS

- The correction factors of cooling power and input power take into account the presence of glycol and diverse evaporation temperatures.
- The pressure drop correction factor considers the different flow rate resulting from the application of the water flow rate correction factor.
- The water flow rate correction factor is calculated to keep the same Δt that would be present with the absence of glycol.

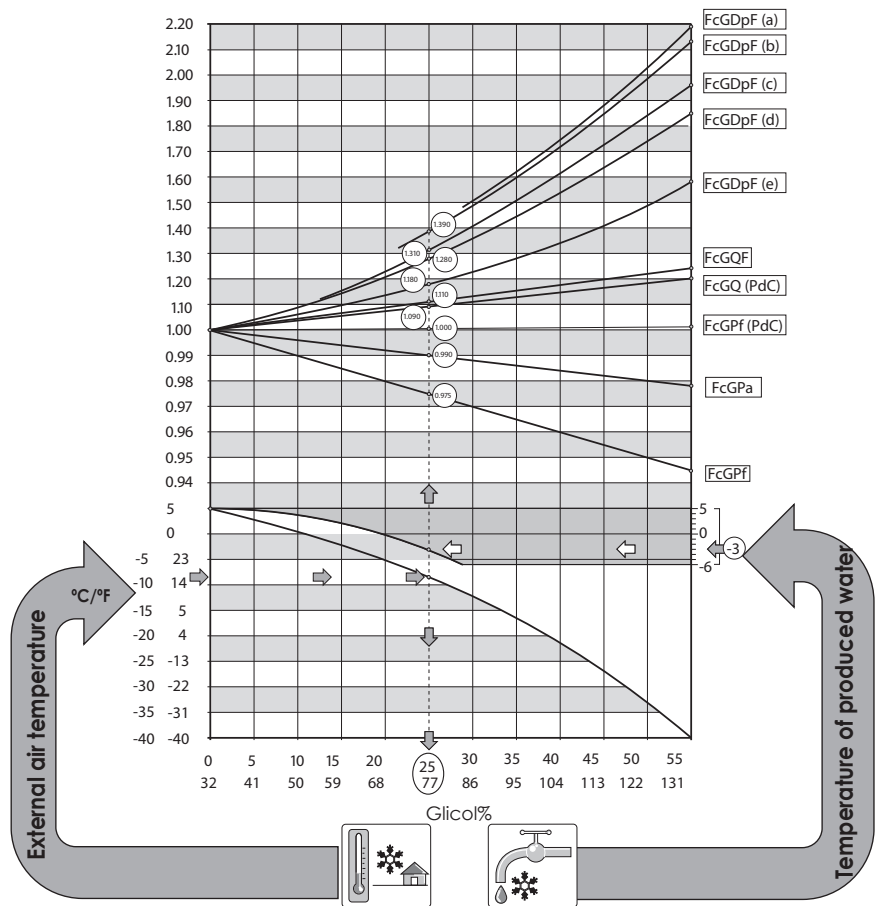
NOTE

On the following page an example is given to help graph reading. Using the diagram below it is possible to determine the percentage of glycol required; this percentage can be calculated by taking of the following factors into consideration one: Depending on which fluid is considered (water or air), the graph is interpreted by the right or left side at the crossing point on the curves with the external temperature line or the water produced line. A point from which the vertical line will pass is obtained and this will distinguish both glycol percentage and relative correction coefficients.

11.1. HOW TO INTERPRET GLYCOL CURVES

The curves shown in the diagram summarise a significant number of data, each of which is represented by a specific curve. In order to use these curves correctly it is first necessary to make some initial reflections.

- If you wish to calculate the percentage of glycol on the basis of the external air temperature, enter from the left axis and on reaching the curve draw a vertical line, which in turn will intercept all the other curves; the points obtained from the upper curves represent the coefficients for the correction of the cooling capacity and input power, the flow rates and the pressure drops (remember that these coefficients must be multiplied by the nominal value of the size in question); while the glycol percentage value recommended to produce desired water temperature is on the lower axis.



KEY:

- FcGPf Corrective factors for cooling capacity
- FcGPa Corrective factors of the input power
- FcGDpF (a) Correction factors for pressure drop (evaporator) (av. temp. = -3.5 °C / 26 °F)
- FcGDpF (b) Correction factors for pressure drops (av. temp. = 0.5 °C) / (33 °F)
- FcGDpF (c) Correction factors for pressure drops (av. temp. = 5.5 °C) / (42 °F)
- FcGDpF (d) Correction factors for pressure drops (av. temp. = 9.5 °C) / (49 °F)
- FcGDpF (e) Correction factors for pressure drops (av. temp. = 47.5 °C) / (118 °F)
- FcGQF Correction factor of flow rates (evap.) (av. temp. = 9.5 °C) / (49 °F)
- FcGQC Correction factors of flow rates (condenser) (av. temp. = 47.5 °C) / (118 °F)

NOTE

Although the graph arrives at external air temperatures of -40°C, unit operational limits must be considered.

- If you wish to calculate the percentage of glycol on the basis of the temperature of the water produced, enter from the right axis and on reaching the curve draw a vertical line, which in turn will intercept all the other curves; the points obtained from the upper curves represent the coefficients for the correction of the cooling capacity and input power, the flow rates and the pressure drops (remember that these coefficients must be multiplied by the nominal value of the size

in question); while the lower axis recommends the glycol percentage value necessary to produce water at the desired temperature.

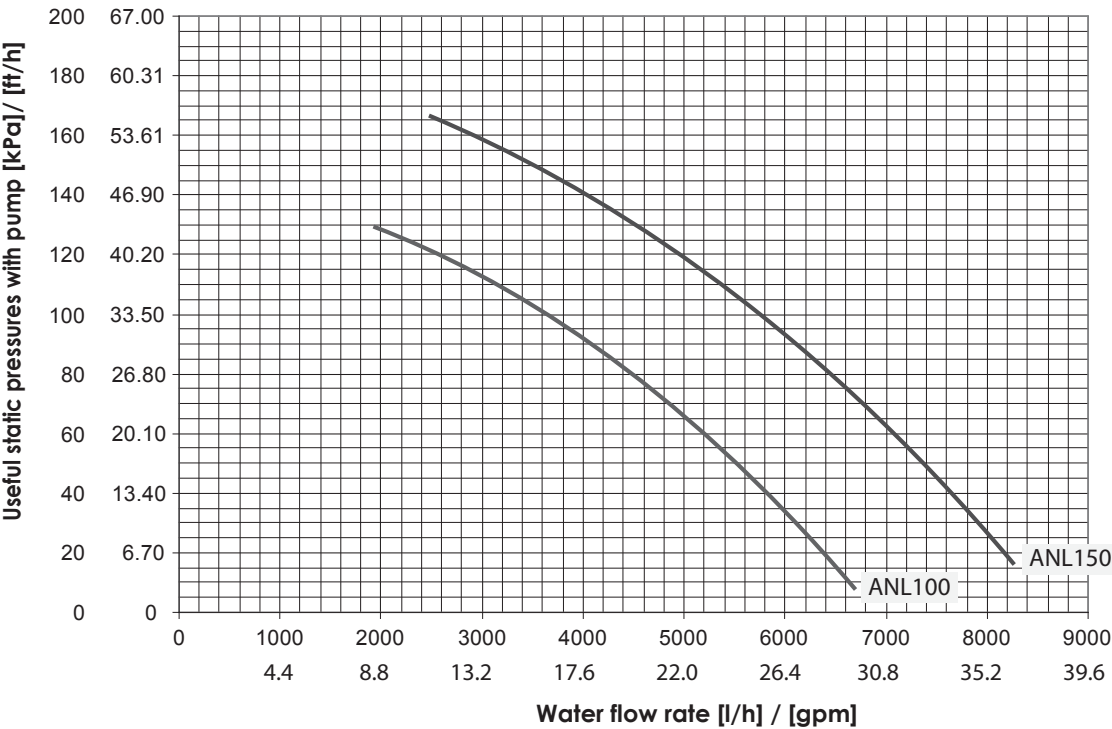
Initial rates for "EXTERNAL AIR TEMPERATURE" and "TEMPERATURE OF PRODUCED WATER", are not directly related, therefore it is not possible to refer to the curve of one of these rates to obtain corresponding point on the curve of the other rate.

11.2. STATIC PRESSURES USEFUL TO THE SYSTEM

The static pressures stated here are at net of the pressure drops of the heat exchangers, filter, storage tank. Therefore are to be considered USEFUL TO SYSTEM.

- The static pressures are calculated in cooling mode.
- WITH PRESENCE OF GLYCOL for static pressures useful to system PLEASE CONTACT COMPANY.

11.2.1. Useful static pressures with storage tank and/or pump [A]



Average water temperature °C / °F	5/41	10/50	15/59	20/68	30/86	40/104	50/122
Multiplicative coefficients	1,02	1	0,985	0,97	0,95	0,93	0,91

12. STORAGE TANK

The following tables highlight principle characteristics for hydraulic circuit components, whilst the graph on the following page shows relative static pressures.

12.1. MINIMUM/MAXIMUM CONTENT OF SYSTEM WATER

The minimum water content of system recommended for units without hydronic kit is calculated using following formula:

$$\text{Volume} = \text{PFN}_{(kW)} \times 4(l) = \text{litres of system}$$

PFN: Nominal cooling capacity

That resulting minimum water content necessary for correct function of system.

The adjacent table indicates maximum water capacity in litres of hydraulic plant, compatible with expansion vessel supplied as standard IN THE VERSIONS WITH STORAGE TANK OR PUMP ONLY. The values shown in the table refer to three maximum and minimum water temperatures. If the effective water content of the hydraulic plant (including the storage tank) is greater than that given in the table at operational conditions, another dimensioned expansion vessel must be installed, using thenormal criteria, with reference to the additional volume of water.

In the following tables it is possible to work out the maximum values of the system also for glycoled water functioning.

Values are worked out by multiplying the reference value by the corrective coefficient.

12.2. EXPANSION VESSEL CALIBRATION

Standard pre-load pressure value of expansion vessel when empty is 1.5 bar, (22psi) maximum value is 6 bar (87psi).

Calibration of the vessel must be regulated using the maximum level difference (H) of the user (see diagram) by using the following formula:

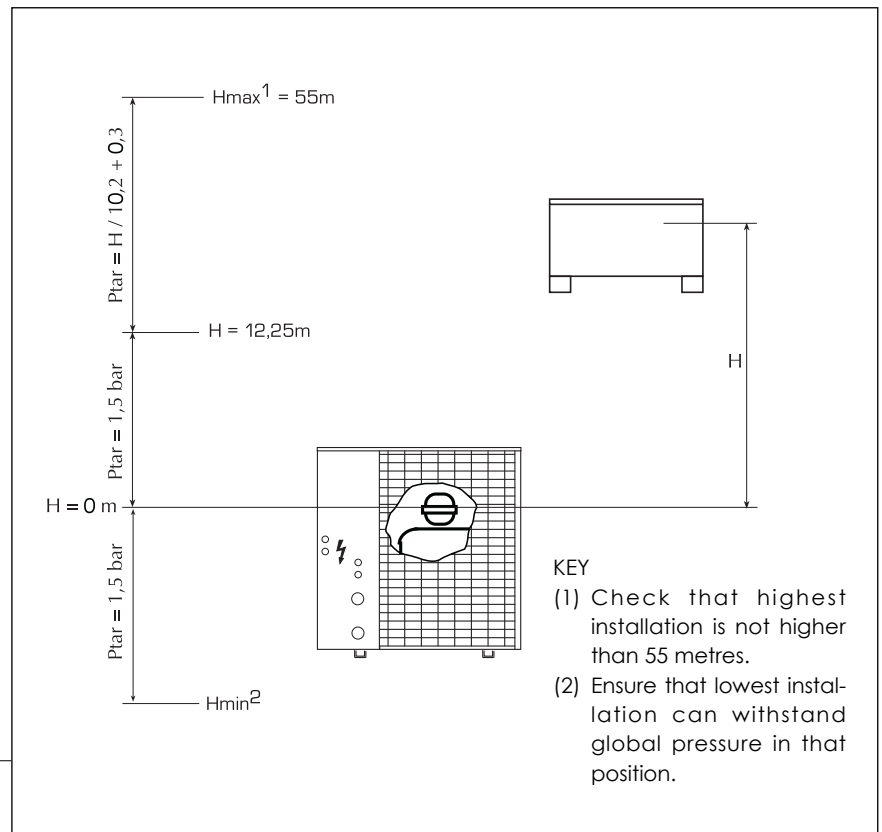
$$p \text{ (calibration) [bar]} = H \text{ [m]} / 10,2 + 0,3.$$

ANL 100-150						
Hydraulic height	H m/ft.	30/98	25/82	20/66	15/49	≥12.25/40
Calibration of expansion vessel	bar/psi	3.2/46	2.8/41	2.3/33	1.8/15	1.5/22
Water content reference values	l (1)	257	303	348	394	419
Water content reference values	l (2)	116	136	157	177	189

Glycoled water	Water temp. °C/°F		Corrective coefficients	Recommended conditions
	max.	min.		
10%	40 /104	-2 /28	0,507	(1)
10%	60 /140	-2 /28	0,686	(2)
20%	40 /104	-6 /21	0,434	(1)
20%	60 /140	-6 /21	0,604	(2)
35%	40 /104	-6 /21	0,393	(1)
35%	60 /140	-6 /21	0,555	(2)

Recommended operational conditions:

- (1) Cooling: Max water temp. = 40 °C (104 °F), min water temp. = 4 °C (39° F).
- (2) Heating (hot air pump): Max water temp. = 60 °C (140 °F), min water temp. = 4 °C/39 °F



For example: if level difference (H) is equal to 20m (66 ft.), the calibration value of the vessel will be 2.3 bar (33psi). If calibration value obtained from formula is less than 1.5 bar (22psi) (that is for H < 12.25m (40 ft.)), keep calibration as standard.

13. SOUND DATA

Sound power

Aermec determines sound power values in agreement with the 9614 Standard, in compliance with that requested by Eurovent certification.

ANL	Total sound levels			Octave band [Hz]						
	Pow. dB(A)	Pressure.		125	250	500	1000	2000	4000	8000
		dB(A) 10 m/33 ft.	dB(A) 1 m/3 ft.	Sound power for centre of band [dB] frequency						
100	76.0	44.0	58.0	61.2	66.0	71.4	72.0	68.9	60.5	48.6
150	77.0	45.0	59.0	62.4	67.3	72.2	72.7	69.7	61.5	49.6

Sound Pressure

Sound pressure measured in free field conditions with reflective surface (directivity factor Q=2) at 10mt distance from external surface of unit, in compliance with ISO 3744 regulations.

KEY

- Water input temperature 12 °C / 54 °F
- Temperature of produced water 7 °C / 45 °F
- External air temperature 35 °C / 95 °F

14. PARAMETER CALIBRATION OF SAFETY AND CONTROL

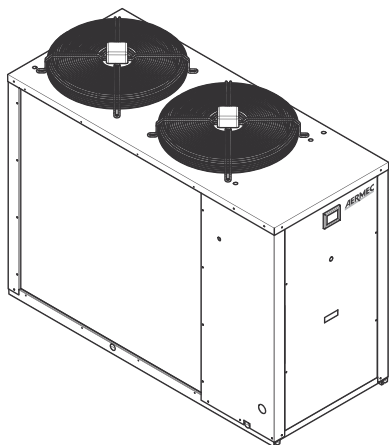
CONTROL PARAMETERS

ANL		min.	standard	max.
Cooling set point	°C/°F	4 / 39	7 / 45	18 / 64
Heating set point	°C/°F	35 / 95	45 / 113	50 / 122
Defrosting mode	°C/°F	-9 / 16	3 / 37	4 / 39
Total differential	°C/°F	3 / 37	5 / 41	10 / 50
Autostart		auto		

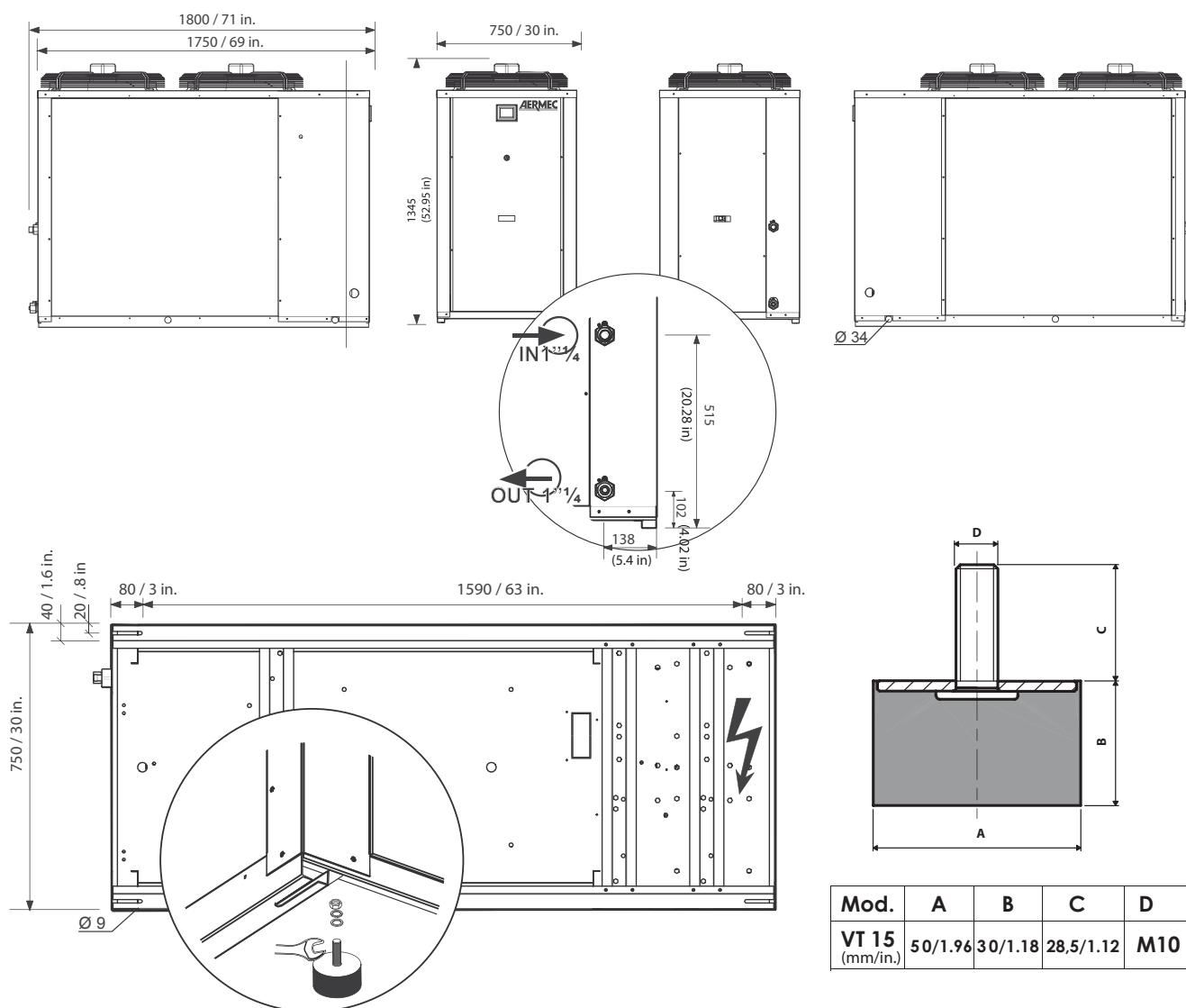
				100H	150H
SAFETY AND CONTROL COMPONENTS ELECTRIC DATA					
High pressure pressure switch			bar / psi	42 / 609	42 / 609
Low pressure pressure switch	cold		bar / psi	4 / 58	4 / 58
	PdC		bar / psi	2 / 29	2 / 29
High pressure transducer			bar / psi	40 / 580	40 / 580

CALIBRATION THERMOMAGNETIC ANL60HZ			
Models 60Hz	Compressors magnet circuit breakers	Pumps magnet circuit breakers	Fan magnet circuit breakers
ANL100HA 220V	19,0 A	3,5 A	Fixed 6A (also for auxiliary)
ANL100HA 460V	10,0 A	1,8 A	Fixed 6A (also for auxiliary)
ANL150HA 220V	23,0 A	5,7 A	Fixed 6A (also for auxiliary)
ANL150HA 460V	12,5 A	3,0 A	Fixed 6A (also for auxiliary)

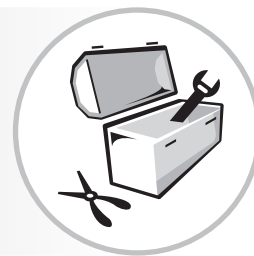
14.2.1. ANL 100-150 HA



	VERS.	WEIGHTS lbs.	BARYCENTRES		KIT VT
			Gx	Gy	
ANL100H	A	800	381	640	15
ANL150H	A	866	382	671	15



FOR THE INSTALLER



15. RECEIVING THE PRODUCT AND INSTALLATION

15.1. RECEIVING THE PRODUCT AND HANDLING

The unit is sent from the factory wrapped in estincoil placed on a pallet. Before handling the unit, verify the lifting capacity of the machinery used. On removal of the packaging, handling must be carried out by qualified staff, which is suitably equipped. To prevent the unit structure being damaged by the belts place protections between the latter and the machine. It is prohibited to stop under the unit.

- The hooking point of the lifting frame must be on the vertical of the centre of gravity
- The instructions are on the machine are part of the same, you should read them carefully and keep them.

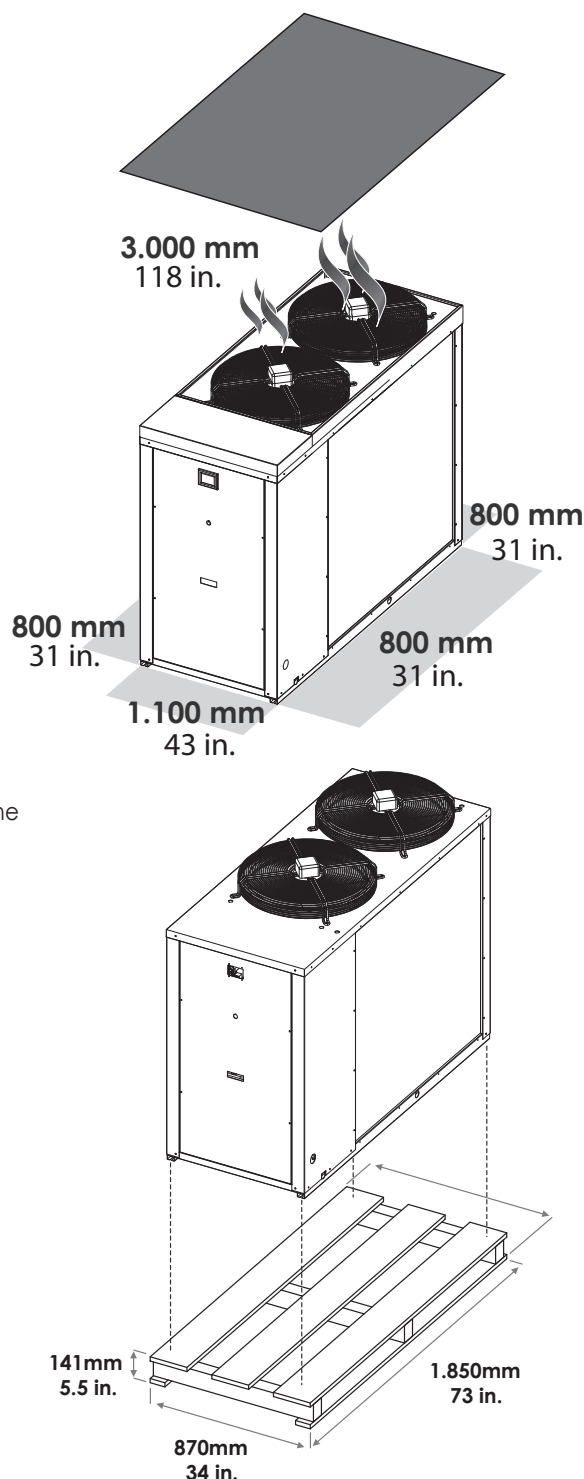
Before beginning installation consent with client and pay attention to the following recommendations:

- The support surface must be capable of supporting the unit weight.
- The safety differences between the unit and other appliances or structures must be scrupulously respected so that the inlet and outlet air from the fans is free to circulate.
- The unit must be installed by an enabled technician in compliance with the national legislation in force in the country of destination, respecting the minimum technical spaces in order to allow maintenance.

15.1.1. SELECTION AND PLACE OF INSTALLATION

Before installing the unit, decide with the customer the position in which it will be placed, pay attention to the following points: It is compulsory to provide the necessary technical spaces, to allow REGULAR AND EXTRAORDINARY MAINTENANCE INTERVENTIONS

- Take into account that when the chiller is working, vibrations may be generated; it is therefore advisable to install anti-vibration supports (AVX accessories), fitting them to the holes in the base according to the assembly diagram.
- Fasten the unit by checking carefully that its on the same level;



FEAUTERS WATER

PH	6-8
Electric conductivity	less than 200 mV/cm (25°C)/(77°F)
Chloride ions	less than 50 ppm
Sulphuric acid ions	less than 50 ppm
Total iron	less than 0,3 ppm

Alkalinity M	less than 50 ppm
Total hardness	less than 50 ppm
Sulphur ions	none
Ammonia ions	none
Silicone ions	less than 30 ppm

16. INTERNAL HYDRAULIC CIRCUIT

The internal hydraulic circuit of the ANL is made up according to the version:

ANL H version A (fig. 3)

(with storage tank and pumps)

- Plate heat exchanger outside the storage tank
- Differential pressure switch
- Filter
- Circulator/Pump
- Storage tank
- Safety valve (calibrated 6 bar / 87psi)
- Expansion vessel
- Manual air vent valve
- Water inlet/outlet probes (SIW- SUW)

17. EXTERNAL HYDRAULIC CIRCUIT ANL (NOT PROVIDED)

The choice and the installation of components external to the ANL is up to the installer, who must operate according to the rules of good technical design and in compliance with the regulations in force in the country of destination (Ministerial Decree 329/2004).

Before connecting the pipes make sure that they do not contain stones, sand, rust, sludge or foreign bodies that could damage the system. It is good practice to realise a unit by-pass to be able to wash the pipes without having to disconnect the appliance.

The connection pipes must be adequately supported so that its weight is not borne by the appliance.

It is recommended to install the following tools on the evaporator water circuit, whenever not envisioned in the version in your possession:

1. two manometers with suitable

scale (in inlet and outlet).

2. Two anti-vibration joints (in inlet and in outlet).
3. Two cut-off valves (in normal input, in calibration valve output).
4. A flow meter (in inlet) or a differential pressure switch (inlet - outlet).
5. two thermometers (in inlet and in outlet).
6. Pump (if not supplied with the machine)
7. Expansion vessel (if not supplied with the machine)
8. Safety valve (if not supplied with the machine)
9. Storage tank (if not supplied with the machine)

It is necessary that the cooling unit water flow rate is in compliance with the values given in the performance tables. The system water content must be such to prevent functioning inefficiency of the cooling circuits.

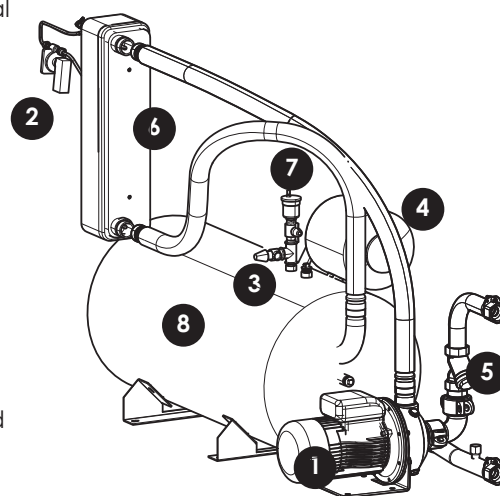
An appropriate load/reintegration system must be prepared for the ANL A chillers, which is engaged on the return line along with a drain cock in the lower part of the system.

The systems loaded with anti-freeze or particular legal dispositions, make the use of water disconnectors mandatory.

Supply/reintegration water details must be conditioned with appropriate treatment systems.

Example of hydraulic circuits

the drawing shown here are an example



▲
fig 3
version A
ANL 100 - 150

KEY

- 1 Circulator/pump
- 2 Differential pressure switch
- 3 Safety valve
- 4 Expansion vessel
- 5 Water filter
- 6 Plate heat exchanger
- 7 Vent valve
- 8 Storage tank

[illegible]



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